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NUMERICAL RESULTS FOR MUTUAL RADIATION IMPEDANCE COEFFICIENTS B--ETC(U)
MAR 65 D T PORTER, B F COLE

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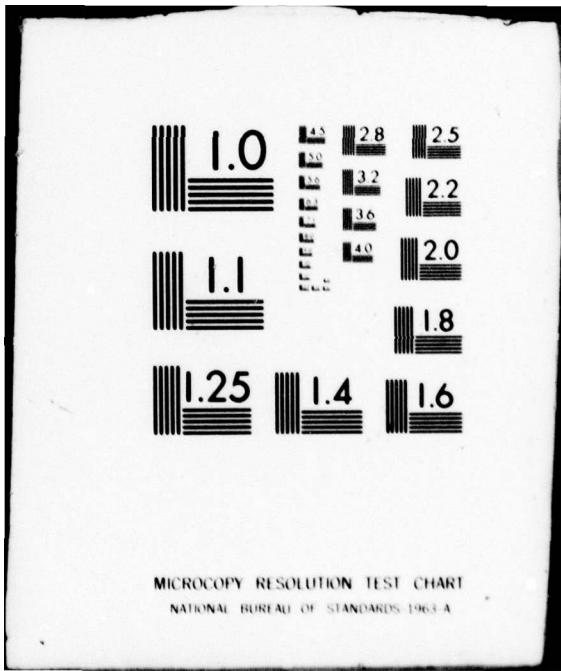
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E. ARASE (HUDSON LABS)

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U. S. Navy Underwater Sound Laboratory
Fort Trumbull, New London, Connecticut

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NUMERICAL RESULTS FOR MUTUAL RADIATION IMPEDANCE COEFFICIENTS
BETWEEN CIRCULAR PISTONS IN AN INFINITE RIGID PLANE

COPY NO. 34

USL Tech. Memo.

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David T. Porter and Bernard F. Cole

USL Technical Memorandum No. 960-17-65

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In reference (a), Pritchard derived an equation for the mutual radiation impedance between two circular pistons in an infinite rigid baffle. This memorandum presents computer results for mutual impedance coefficients for various k_a 's, and discussed the difficulties involved in obtaining accurate results.

Pritchard's equation for circular pistons of radius "a", and center-to-center spacing "d" is

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(17) SF0010313

$$\frac{Z_{12}}{\rho \pi a^2} = \sum_{p=0}^{\infty} \sigma_p(k_a) \left(\frac{a}{d}\right)^p h_p^{(2)}(kd)$$

where

$$\sigma_p(k_a) = \frac{2\Gamma(p+\frac{1}{2})}{\sqrt{\pi}} \sum_{n=0}^p \frac{J_{n+1}(ka) J_{p-n+1}(ka)}{n! (p-n)!} \quad (2)$$

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and where $h_p^{(2)}(kd)$ denotes the spherical Hankel Function of the second kind,

$$h_p^{(2)}(kd) = j_p(kd) - i n_p(kd) \quad (3)$$

Pritchard used Hankel Functions of the second kind, because he used a time dependence of $e^{-i\omega t}$, which will result in the circular pistons having positive self reactances (X_{11}).

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For $d/a > 3$, equation (1) converges rapidly. The example done out by Pritchard in reference (a) shows that for $ka = 1$, and $kd = 3$, four place accuracy can be obtained by taking four terms in the "p" summation for R_{12} , and six terms for X_{12} . However, as d/a becomes closer to 2, which corresponds to the pistons touching, the number of terms needed increases rapidly, and hand computations are not practical. In particular, for $d/a = 2$, the convergence of X_{12} is very slow (although R_{12} still converges rapidly). Also, increasing ka further slows down the convergence for $d/a = 2$. For $ka \leq 1.58$, and $d = 2a$, three place accuracy can be obtained for X_{12} by using 28 terms or more in the "p" summation. However, other limitations often prevented us from taking 28 terms, such as the generation in equation (1) of numbers greater in magnitude than 10^{38} , which led to overflow problems.

The cylindrical Bessel Functions, $J_n(ka)$, were generated by reverse recursion, as described in reference (b), to avoid roundoff difficulties. The spherical Bessel Functions, $j_p(kd)$, were usually generated by reverse recursion, but for large kd had to be generated by forward recursion. The spherical Neuman Functions, $n_p(kd)$ were always generated by forward recursion.

When $d \gg a$, equation (1) may be approximated by taking just the $p = 0$ term.

$$\frac{R_{12}}{\rho \pi a^2} \rightarrow 2 J_1^2(ka) h_0^{(2)}(kd) \quad (4)$$

so that

$$\frac{R_{12}}{\rho \pi a^2} \rightarrow \frac{2 J_1^2(ka) \sin kd}{kd} \quad (5)$$

and

$$\frac{X_{12}}{\rho \pi a^2} \rightarrow \frac{2 J_1^2(ka) \cos kd}{kd} \quad (6)$$

Of course when ka approaches 3.832, the first zero of $J_1(ka)$, equations 4, 5 and 6 no longer hold. However, pistons with ka this large are rarely encountered in sonar arrays.

Reference (c) also contains results (in graphical form) for Pritchard's equation. These results are generally in good agreement with the results given in this report for $d/a > 3$, but reference (c) used only a small number of terms in the "p" summation, so that for $d/a < 3$, the results differ from those presented here. Also, reference (c) contains much less data than is

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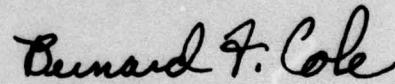
given here. The results in reference (c) were also for an $e^{-i\omega t}$ time dependence, Hankel Functions of the second kind, and positive self reactances.

The tables given in this report are for $ka = 1.58, 1.5, 1.4, 1.3, 1.2, 1.0, 0.9, 0.8, 0.7, 0.6, 0.5, 0.4, 0.3, 0.2$ and 0.1 . For each ka , $R_{12}/\rho c A$ (RESIJ) and $X_{12}/\rho c A$ (REACIJ) are given for $k\delta$ from $2ka$ to 20.0 , in steps of 0.1 . For each ka , the number of terms used in the "p" summation is given by JMAX. MSTAR concerns the reverse recursion of the Bessel Functions.

The tables presented here are for an $e^{+i\omega t}$ time dependence, which was obtained by using Hankel Functions of the first kind, and results in mutual reactances corresponding to negative self reactances. If one wishes to use these tables and is using the $e^{-i\omega t}$ convention in his problem, he must change the signs of the X_{12} given here, and use positive self reactances. If one is using the $e^{+i\omega t}$ convention, the tables given here may be used directly, but negative self reactances must be used.



DAVID T. PORTER
Mathematician



BERNARD F. COLE
Mathematician

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- (a) R. L. Pritchard, Journal of the Acoustical Society of America, Vol. 32, 730-737 (1960).
- (b) J. B. Randels and K. F. Reeves, "Communications of the Association for Computing Machinery", May 1958, page 3.
- (3) E. L. Barrett, "Mutual Radiation Impedance Coefficients for Identical Circular Pistons in a Stiff Infinite Plane Baffle", USL Tech. Memo, No. 1150-39-58, 23 July 1958.

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0.500000	0.004786-0.008869		0.400000	0.004860-0.011706		
0.700000	0.004594-0.005494		0.600000	0.004698-0.006929		
0.900000	0.004345-0.003468		0.800000	0.004476-0.004375		
1.100000	0.004045-0.002070		1.000000	0.004201-0.002712		
1.300000	0.003700-0.001035		1.200000	0.003877-0.001517		
1.500000	0.003320-0.000241		1.400000	0.003514-0.000613		
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1.900000	0.002487 0.000846		1.800000	0.002701 0.000626		
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2.900000	0.000413 0.001670		2.800000	0.000598 0.001678		
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4.700000	-0.001061 0.000014		4.600000-0.001077	0.000122		
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19.500000	0.000155-0.000204	19.600000	0.000174-0.000186
19.700000	0.000190-0.000167	19.800000	0.000205-0.000146
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0.700000	0.018286-0.022392		0.800000	0.017817-0.017764		1.000000	0.016722-0.010982	
0.900000	0.017293-0.014051		1.200000	0.015437-0.006153		1.400000	0.013992-0.002518	
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15.500000	0.000264	0.001250	15.600000 0.000137 0.001262
15.700000	0.000010	0.001261	15.800000-0.000115 0.001248
15.900000	-0.000238	0.001223	16.000000-0.000357 0.001185
16.100000	-0.000471	0.001137	16.200000-0.000579 0.001078
16.300000	-0.000680	0.001008	16.400000-0.000773 0.000930
16.500000	-0.000858	0.000843	16.600000-0.000932 0.000749
16.700000	-0.000997	0.000649	16.800000-0.001051 0.000544
16.900000	-0.001094	0.000434	17.000000-0.001126 0.000321
17.100000	-0.001147	0.000207	17.200000-0.001156 0.000091
17.300000	-0.001154	-0.000024	17.400000-0.001140-0.000197
17.500000	-0.001116	-0.000248	17.600000-0.001082-0.000355
17.700000	-0.001039	-0.000457	17.800000-0.000988-0.000553
17.900000	-0.000935	-0.000643	18.000000-0.000912-0.000726
18.100000	-0.000631	-0.000800	18.200000-0.000629-0.000866
18.300000	-0.000551	-0.000922	18.400000-0.000459-0.000969
18.500000	-0.000361	-0.001005	18.600000-0.000260-0.001031
18.700000	-0.000156	-0.001047	18.800000-0.000052-0.001052
18.900000	0.000052	-0.001046	19.000000 0.000155-0.001030
19.100000	0.000255	-0.001005	19.200000 0.000352-0.000969
19.300000	0.000444	-0.000974	19.400000 0.000531-0.000870
19.500000	0.000612	-0.000808	19.600000 0.000686-0.000739
19.700000	0.000753	-0.000663	19.800000 0.000811-0.000582
19.900000	0.000860	-0.000495	20.000000 0.000901-0.000404

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KA= 0.300000 JMAX= 6 MSTAR= 8

KD	RESIJ	REACIJ	KD	RESIJ	REACIJ
0.700000	0.040808-0.052347		0.600000	0.041726-0.067723	
0.900000	0.038600-0.032392		0.800000	0.039764-0.041145	
1.100000	0.035940-0.019286		1.000000	0.037323-0.025260	
1.300000	0.032891-0.009774		1.200000	0.034460-0.014185	
1.500000	0.029522-0.002554		1.400000	0.031241-0.005926	
1.700000	0.025911-0.003009		1.600000	0.027742-0.000409	
1.900000	0.022140-0.007266		1.800000	0.024041-0.005285	
2.100000	0.018293-0.010432		2.000000	0.020221-0.008975	
2.300000	0.014452-0.012657		2.200000	0.016366-0.011655	
2.500000	0.010699-0.014053		2.400000	0.012560-0.013452	
2.700000	0.007110-0.014718		2.600000	0.008879-0.014471	
2.900000	0.003755-0.014741		2.800000	0.005399-0.014804	
3.100000	0.000696-0.014209		3.000000	0.002185-0.014539	
3.300000-0.002017	0.013207		3.200000-0.000707	0.013761	
3.500000-0.004341	0.011822		3.400000-0.003229	0.012557	
3.700000-0.006249	0.010140		3.600000-0.005348	0.011012	
3.900000-0.007722	0.008246		3.800000-0.007040	0.009214	
4.100000-0.008758	0.006225		4.000000-0.008295	0.007247	
4.300000-0.009364	0.004155		4.200000-0.009114	0.005191	
4.500000-0.009557	0.002111		4.400000-0.009510	0.003126	
4.700000-0.009369	0.000161		4.600000-0.009509	0.001121	
4.900000-0.008837	-0.001635		4.800000-0.009143	-0.000760	
5.100000-0.008008	-0.003228		5.000000-0.008457	-0.002460	
5.300000-0.006934	-0.004576		5.200000-0.007498	-0.003935	
5.500000-0.005671	-0.005650		5.400000-0.006323	-0.005149	
5.700000-0.004279	-0.006430		5.600000-0.004988	-0.006078	
5.900000-0.002816	-0.006910		5.800000-0.003553	-0.006708	
6.100000-0.001340	-0.007091		6.000000-0.002076	-0.007077	
6.300000-0.000075	-0.006987		6.200000-0.000614	-0.007074	
6.500000-0.001433	-0.006619		6.400000-0.000776	-0.006834	
6.700000-0.002639	-0.006016		6.600000-0.002055	-0.006345	
6.900000-0.003672	-0.005216		6.800000-0.003179	-0.005638	
7.100000-0.004505	-0.004258		7.000000-0.004115	-0.004754	
7.300000-0.005117	-0.003188		7.200000-0.004839	-0.003734	
7.500000-0.005497	-0.002051		7.400000-0.005336	-0.002625	
7.700000-0.005644	-0.000893		7.600000-0.005600	-0.001472	
7.900000-0.005564	-0.000240		7.800000-0.005632	-0.000321	
8.100000-0.005271	0.001309		8.000000-0.005443	0.000785	
8.300000-0.004787	0.002274		8.200000-0.005052	0.001806	
8.500000-0.004139	0.003106		8.400000-0.004482	0.002709	
8.700000-0.003359	0.003778		8.600000-0.003764	0.003463	
8.900000-0.002483	0.004273		8.800000-0.002931	0.004049	
9.100000-0.001548	0.004579		9.000000-0.002020	0.004450	
9.300000-0.000591	0.004694		9.200000-0.001070	0.004661	
9.500000-0.000350	0.004620		9.400000-0.000116	0.004680	
9.700000-0.001241	0.004369		9.600000-0.000804	0.004516	
9.900000-0.002056	0.003957		9.800000-0.001660	0.004182	
			10.000000-0.002429	0.003698	

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10.100000-0.004725	0.005961	10.200000-0.005245	0.005405
10.300000-0.005702	0.004806	10.400000-0.006095	0.004171
10.500000-0.006419	0.003507	10.600000-0.006673	0.002820
10.700000-0.007456	0.002119	10.800000-0.006968	0.001409
10.900000-0.007009	0.000699	11.000000-0.006979	0.000005
11.100000-0.006881-0.000697		11.200000-0.006716-0.001360	
11.300000-0.006487-0.002016		11.400000-0.006198-0.002632	
11.500000-0.005852-0.003210		11.600000-0.005454-0.003747	
11.700000-0.005008-0.004238		11.800000-0.004521-0.004678	
11.900000-0.003996-0.005064		12.000000-0.003441-0.005394	
12.100000-0.002660-0.005665		12.200000-0.002260-0.005875	
12.300000-0.001648-0.006024		12.400000-0.001029-0.006110	
12.500000-0.000409-0.006135		12.600000-0.000206-0.006098	
12.700000-0.000808-0.006001		12.800000-0.001394-0.005847	
12.900000-0.001957-0.005636		13.000000-0.002493-0.005374	
13.100000-0.002996-0.005061		13.200000-0.003462-0.004704	
13.300000-0.003887-0.004305		13.400000-0.004268-0.003869	
13.500000-0.004601-0.003401		13.600000-0.004884-0.002907	
13.700000-0.005116-0.002390		13.800000-0.005295-0.001858	
13.900000-0.005419-0.001315		14.000000-0.005489-0.000766	
14.100000-0.005506-0.000218		14.200000-0.005471-0.000325	
14.300000-0.005385-0.000856		14.400000-0.005254-0.001372	
14.500000-0.005086-0.001868		14.600000-0.004900-0.002338	
14.700000-0.004798-0.002778		14.800000-0.001080-0.003185	
14.900000-0.003471-0.003555		15.000000-0.003211-0.003884	
15.100000-0.002836-0.004171		15.200000-0.002414-0.004412	
15.300000-0.001964-0.004606		15.400000-0.001494-0.004752	
15.500000-0.001013-0.004850		15.600000-0.000526-0.004897	
15.700000-0.000039-0.004896		15.800000-0.000444-0.004845	
15.900000-0.000917-0.004748		16.000000-0.001375-0.004604	
16.100000-0.001814-0.004417		16.200000-0.002230-0.004187	
16.300000-0.002619-0.003920		16.400000-0.002978-0.003616	
16.500000-0.003302-0.003280		16.600000-0.003520-0.002916	
16.700000-0.003839-0.002527		16.800000-0.004047-0.002117	
16.900000-0.004212-0.001692		17.000000-0.004334-0.001254	
17.100000-0.004411-0.000810		17.200000-0.004443-0.000362	
17.300000-0.004431-0.000084		17.400000-0.004375-0.000524	
17.500000-0.004275-0.000954		17.600000-0.004135-0.001369	
17.700000-0.003955-0.001767		17.800000-0.003737-0.002142	
17.900000-0.003485-0.002491		18.000000-0.003201-0.002812	
18.100000-0.002888-0.003102		18.200000-0.002550-0.003357	
18.300000-0.002191-0.003577		18.400000-0.001813-0.003758	
18.500000-0.001421-0.003900		18.600000-0.001019-0.004002	
18.700000-0.000612-0.004063		18.800000-0.000202-0.004083	
18.900000-0.000205-0.004062		19.000000-0.000606-0.004001	
19.100000-0.000996-0.003901		19.200000-0.001373-0.003763	
19.300000-0.001732-0.003589		19.400000-0.002071-0.003381	
19.500000-0.002385-0.003142		19.600000-0.002672-0.002874	
19.700000-0.002930-0.002580		19.800000-0.003157-0.002263	
19.900000-0.003349-0.001927		20.000000-0.003507-0.001575	

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KA=	0.400000	JMAX=	R	MSTAR=	10
KD	RFSTIJ	RFACIJ	KD	RFSTIJ	REACIJ
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	0.900000	0.067850-0.060027		1.000000	0.065611-0.046535
	1.100000	0.063187-0.035472		1.200000	0.060591-0.026149
	1.300000	0.057840-0.018153		1.400000	0.054948-0.011218
	1.500000	0.051933-0.005164		1.600000	0.048812 0.000139
	1.700000	0.045602 0.004785		1.800000	0.042321 0.008844
	1.900000	0.038989 0.012374		2.000000	0.035623 0.015418
	2.100000	0.032241 0.018014		2.200000	0.028862 0.020192
	2.300000	0.025504 0.021980		2.400000	0.022184 0.023401
	2.500000	0.018919 0.024479		2.600000	0.015727 0.025234
	2.700000	0.012622 0.025686		2.800000	0.009619 0.025855
	2.900000	0.006733 0.025761		3.000000	0.003977 0.025421
	3.100000	0.001362 0.024856		3.200000	-0.001102 0.024084
	3.300000	-0.003402 0.023124		3.400000	-0.005533 0.021996
	3.500000	-0.007487 0.020717		3.600000	-0.009258 0.019308
	3.700000	-0.010842 0.017787		3.800000	-0.012336 0.016172
	3.900000	-0.013438 0.014483		4.000000	-0.014448 0.017737
	4.100000	-0.015267 0.010952		4.200000	-0.015896 0.009145
	4.300000	-0.016341 0.007333		4.400000	-0.016605 0.005532
	4.500000	-0.016694 0.003757		4.600000	-0.016615 0.002024
	4.700000	-0.016377 0.000344		4.800000	-0.015988-0.001269
	4.900000	-0.015458-0.002803		5.000000	-0.014797-0.004247
	5.100000	-0.014017-0.005593		5.200000	-0.013129-0.006833
	5.300000	-0.012146-0.007958		5.400000	-0.011080-0.008962
	5.500000	-0.009944-0.009842		5.600000	-0.008751-0.010594
	5.700000	-0.007514-0.011215		5.800000	-0.006245-0.011704
	5.900000	-0.004958-0.012061		6.000000	-0.003666-0.012288
	6.100000	-0.002379-0.012386		6.200000	-0.001111-0.012358
	6.300000	0.000127-0.012210		6.400000	0.001325-0.011946
	6.500000	0.002474-0.011573		6.600000	0.003563-0.011097
	6.700000	0.004585-0.010525		6.800000	0.005531-0.009867
	6.900000	0.006395-0.009131		7.000000	0.007171-0.008325
	7.100000	0.007854-0.007460		7.200000	0.008441-0.006546
	7.300000	0.008929-0.005592		7.400000	0.009315-0.004609
	7.500000	0.009599-0.003606		7.600000	0.009781-0.002594
	7.700000	0.009861-0.001584		7.800000	0.009842-0.000583
	7.900000	0.009726 0.000398		8.000000	0.009517 0.001351
	8.100000	0.009219 0.002266		8.200000	0.008837 0.003137
	8.300000	0.008377 0.003956		8.400000	0.007845 0.004716
	8.500000	0.007248 0.005412		8.600000	0.006594 0.006038
	8.700000	0.005889 0.006589		8.800000	0.005141 0.007064
	8.900000	0.004360 0.007457		9.000000	0.003552 0.007768
	9.100000	0.002727 0.007996		9.200000	0.001892 0.008139
	9.300000	0.001053 0.008199		9.400000	0.000212 0.008176
	9.500000	-0.001833 0.008073		9.600000	-0.001329 0.007892
	9.700000	-0.002104 0.007637		9.800000	-0.002831 0.007311
	9.900000	-0.003513 0.006920		10.000000	-0.004146 0.006468

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KA= 0.500000 JMAX= 10 MSTAR= 12

KD RESIJ REACIJ KD RESIJ REACIJ

1.100000 0.097328-0.058382	1.000000 0.101048-0.077201
1.300000 0.089121-0.030101	1.200000 0.093344-0.043033
1.500000 0.080054-0.009388	1.400000 0.084682-0.019006
1.700000 0.070335 0.006314	1.600000 0.075263-0.001005
1.900000 0.060183 0.018236	1.800000 0.065299 0.012696
2.100000 0.049821 0.027079	2.000000 0.055014 0.023009
2.300000 0.039474 0.033302	2.200000 0.044632 0.030495
2.500000 0.029360 0.037243	2.400000 0.034375 0.035540
2.700000 0.019684 0.039181	2.600000 0.024455 0.038446
2.900000 0.010634 0.039365	2.800000 0.015070 0.039477
3.100000 0.002374 0.038036	3.000000 0.006396 0.038875
3.300000-0.004955 0.035428	3.200000-0.001414 0.036877
3.500000-0.011244 0.031777	3.400000-0.008235 0.033718
3.700000-0.016415 0.027315	3.600000-0.013973 0.029633
3.900000-0.020422 0.022275	3.800000-0.018566 0.024854
4.100000-0.023253 0.016882	4.000000-0.021984 0.019609
4.300000-0.024928 0.011349	4.200000-0.024233 0.014120
4.500000-0.025496 0.005877	4.400000-0.025346 0.008593
4.700000-0.025036 0.000649	4.600000-0.025389 0.003222
4.900000-0.023652-0.004173	4.800000-0.024453-0.001821
5.100000-0.021467-0.008453	5.000000-0.022651-0.006388
5.300000-0.018620-0.012083	5.200000-0.020116-0.010355
5.500000-0.015263-0.014980	5.400000-0.016995-0.013627
5.700000-0.011553-0.017095	5.600000-0.013442-0.016138
5.900000-0.007650-0.018404	5.800000-0.009616-0.017850
6.100000-0.003708-0.018915	6.000000-0.005675-0.018758
6.300000 0.000126-0.018661	6.200000-0.001769-0.018881
6.500000 0.003718-0.017699	6.400000 0.001960-0.018264
6.700000 0.006951-0.016109	6.600000 0.005386-0.016977
6.900000 0.009725-0.013985	6.800000 0.008401-0.015107
7.100000 0.011965-0.011439	7.000000 0.010916-0.012758
7.300000 0.013617-0.008588	7.200000 0.012867-0.010044
7.500000 0.014651-0.005555	7.400000 0.014212-0.007086
7.700000 0.015060-0.002465	7.600000 0.014933-0.004010
7.900000 0.014863 0.000565	7.800000 0.015036-0.000935
8.100000 0.014096 0.003423	8.000000 0.014547 0.002022
8.300000 0.012817 0.006009	8.200000 0.013516 0.004755
8.500000 0.011098 0.008239	8.400000 0.012007 0.007173
8.700000 0.009026 0.010044	8.600000 0.010100 0.009198
8.900000 0.006694 0.011376	8.800000 0.007886 0.010772
9.100000 0.004204 0.012205	9.000000 0.005463 0.011855
9.300000 0.001656 0.012522	9.200000 0.002931 0.012428
9.500000-0.000843 0.012336	9.400000 0.000384 0.012490
9.700000-0.003213 0.011675	9.600000-0.002051 0.012062
9.900000-0.005360 0.010584	9.800000-0.004319 0.011180
	10.000000-0.006326 0.009896

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10.100000-0.002786	0.003407	10.200000-0.003175	0.003088
10.300000-0.002545	0.002745	10.400000-0.003379	0.002381
10.500000-0.003616	0.002001	10.600000-0.003781	0.001608
10.700000-0.003895	0.001206	10.800000-0.003965	0.000800
10.900000-0.003992	0.000394	11.000000-0.003978	0.000009
11.100000-0.003923	-0.000405	11.200000-0.003831	-0.000790
11.300000-0.003701	-0.001160	11.400000-0.003536	-0.001512
11.500000-0.003339	-0.001843	11.600000-0.003113	-0.002150
11.700000-0.002858	-0.002430	11.800000-0.002580	-0.002682
11.900000-0.002281	-0.002902	12.000000-0.001964	-0.003091
12.100000-0.001632	-0.003245	12.200000-0.001290	-0.003365
12.300000-0.000940	-0.003450	12.400000-0.000587	-0.003490
12.500000-0.000233	-0.003512	12.600000	0.000117-0.003491
12.700000	0.000461	-0.003435	-0.000795-0.003346
12.900000	0.001116	-0.003225	13.000000 0.001421-0.003074
13.100000	0.001707	-0.002895	13.200000 0.001972-0.002690
13.300000	0.002214	-0.002461	13.400000 0.002430-0.002211
13.500000	0.002618	-0.001943	13.600000 0.002778-0.001660
13.700000	0.002908	-0.001365	13.800000 0.003008-0.001060
13.900000	0.003076	-0.000749	14.000000 0.003112-0.000435
14.100000	0.003118	-0.000121	14.200000 0.003092 0.000190
14.300000	0.003036	0.000494	14.400000 0.002950 0.000789
14.500000	0.002837	0.001073	14.600000 0.002696 0.001341
14.700000	0.002531	0.001593	14.800000 0.002343 0.001826
14.900000	0.002135	0.002037	15.000000 0.001908 0.002226
15.100000	0.001665	0.002389	15.200000 0.001408 0.002527
15.300000	0.001141	0.002638	15.400000 0.000866 0.002722
15.500000	0.000586	0.002777	15.600000 0.000304 0.002804
15.700000	0.000022	0.002802	15.800000-0.000256 0.002773
15.900000-0.000528	0.002717	16.000000-0.000792	0.002635
16.100000-0.001045	0.002527	16.200000-0.001284	0.002396
16.300000-0.001507	0.002242	16.400000-0.001713	0.002068
16.500000-0.001899	0.001876	16.600000-0.002064	0.001667
16.700000-0.002207	0.001444	16.800000-0.002326	0.001210
16.900000-0.002420	0.000966	17.000000-0.002490	0.000715
17.100000-0.002534	0.000461	17.200000-0.002552	0.000205
17.300000-0.002544	-0.000051	17.400000-0.002512	-0.000303
17.500000-0.002455	-0.000549	17.600000-0.002374	-0.000786
17.700000-0.002270	-0.001014	17.800000-0.002145	-0.001228
17.900000-0.002000	-0.001428	18.000000-0.001837	-0.001612
18.100000-0.001658	-0.001777	18.200000-0.001464	-0.001923
18.300000-0.001257	-0.002049	18.400000-0.001040	-0.002152
18.500000-0.000815	-0.002234	18.600000-0.000585	-0.002292
18.700000-0.000351	-0.002326	18.800000-0.000116	-0.002337
18.900000	0.000118	-0.002325	19.000000 0.000347-0.002290
19.100000	0.000572	-0.002232	19.200000 0.000788-0.002152
19.300000	0.000294	-0.002054	19.400000 0.001188-0.001934
19.500000	0.001368	-0.001797	19.600000 0.001533-0.001644
19.700000	0.001681	-0.001475	19.800000 0.001810-0.001294
19.900000	0.001921	-0.001101	20.000000 0.002011-0.000900

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10.100000-0.007211	0.009123	10.200000-0.008007	0.008275
10.300000-0.008708	0.007361	10.400000-0.009309	0.006392
10.500000-0.009806	0.005379	10.600000-0.010197	0.004331
10.700000-0.010479	0.003259	10.800000-0.010653	0.002176
10.900000-0.010717	0.001090	11.000000-0.010674	0.000014
11.100000-0.010526	-0.001043	11.200000-0.010276	-0.002071
11.300000-0.009928	-0.003060	11.400000-0.009488	-0.004001
11.500000-0.008962	-0.004886	11.600000-0.008355	-0.005708
11.700000-0.007676	-0.006459	11.800000-0.006932	-0.007133
11.900000-0.006131	-0.007725	12.000000-0.005283	-0.008231
12.100000-0.004395	-0.008646	12.200000-0.003477	-0.008969
12.300000-0.002538	-0.009198	12.400000-0.001588	-0.009332
12.500000-0.000633	-0.009371	12.600000	0.000320-0.009316
12.700000	0.001270-0.009170	12.800000	0.002248-0.008935
12.900000	0.004408-0.008616	13.000000	0.003502-0.008215
13.100000	0.004397-0.007740	13.200000	0.005146-0.007194
13.300000	0.005812-0.006586	13.400000	0.006402-0.005921
13.500000	0.006916-0.005207	13.600000	0.007351-0.004453
13.700000	0.007705-0.003665	13.800000	0.007977-0.002852
13.900000	0.008164-0.002022	14.000000	0.008267-0.001184
14.100000	0.008285-0.000347	14.200000	0.008221 0.000482
14.300000	0.008075 0.001295	14.400000	0.007850 0.002084
14.500000	0.007551 0.002841	14.600000	0.007180 0.003560
14.700000	0.006742 0.004233	14.800000	0.006243 0.004855
14.900000	0.005688 0.005421	15.000000	0.005084 0.005925
15.100000	0.004437 0.006364	15.200000	0.003755 0.006734
15.300000	0.003043 0.007032	15.400000	0.002310 0.007256
15.500000	0.001564 0.007406	15.600000	0.000811 0.007480
15.700000	0.000060 0.007478	15.800000	-0.000683 0.007403
15.900000-0.001410	0.007254	16.000000	-0.002114 0.007036
16.100000-0.002789	0.006750	16.200000	-0.003428 0.006401
16.300000-0.004025	0.005993	16.400000	-0.004575 0.005530
16.500000-0.005073	0.005018	16.600000	-0.005515 0.004462
16.700000-0.005898	0.003868	16.800000	-0.006217 0.003243
16.900000-0.006470	0.002593	17.000000	-0.006657 0.001925
17.100000-0.006775	0.001246	17.200000	-0.006825 0.000562
17.300000-0.006807	-0.000119	17.400000	-0.006721-0.000792
17.500000-0.006569	-0.001449	17.600000	-0.006354-0.002084
17.700000-0.006078	-0.002691	17.800000	-0.005745-0.003264
17.900000-0.005359	-0.003799	18.000000	-0.004923-0.004290
18.100000-0.004443	-0.004733	18.200000	-0.003924-0.005124
18.300000-0.003371	-0.005460	18.400000	-0.002791-0.005737
18.500000-0.002189	-0.005955	18.600000	-0.001571-0.006111
18.700000-0.000943	-0.006205	18.800000	-0.000312-0.006236
18.900000	0.000316-0.006205	19.000000	0.000936-0.006113
19.100000	0.001541-0.005960	19.200000	0.002127-0.005750
19.300000	0.002688-0.005485	19.400000	0.003220-0.005168
19.500000	0.003719-0.004803	19.600000	0.004183-0.004394
19.700000	0.004614-0.003946	19.800000	0.005018-0.003462
19.900000	0.005423-0.002950	20.000000	0.005978-0.002412

KA= 0.600000 JMAX= 10 MSTAR= 12

1.100000 0.137724-0.091918	1.000000 0.142966-0.126638
1.300000 0.126163-0.046996	1.200000 0.132112-0.066960
1.500000 0.113388-0.016039	1.400000 0.119909-0.030302
1.700000 0.099693 0.006974	1.600000 0.106637-0.003719
1.900000 0.085384 0.024301	1.800000 0.092595 0.016260
2.100000 0.070778 0.037113	2.000000 0.078099 0.031219
2.300000 0.056191 0.046134	2.200000 0.063463 0.042062
2.500000 0.041928 0.051879	2.400000 0.049000 0.049388
2.700000 0.028278 0.054762	2.600000 0.035009 0.053655
2.900000 0.015505 0.055147	2.800000 0.021766 0.055244
3.100000 0.003843 0.053379	3.000000 0.009522 0.054511
3.300000-0.006513 0.049794	3.200000-0.001509 0.051793
3.500000-0.015407 0.044726	3.400000-0.011151 0.047425
3.700000-0.022730 0.038506	3.600000-0.019270 0.041739
3.900000-0.028416 0.031461	3.800000-0.025779 0.035066
4.100000-0.032447 0.023907	4.000000-0.030637 0.027728
4.300000-0.034851 0.016149	4.200000-0.033849 0.020036
4.500000-0.035697 0.008469	4.400000-0.035463 0.012283
4.700000-0.035096 0.001125	4.600000-0.035570 0.004740
4.900000-0.033192-0.005656	4.800000-0.034297-0.002348
5.100000-0.030158-0.011681	5.000000-0.031805-0.008773
5.300000-0.026190-0.016795	5.200000-0.028278-0.014360
5.500000-0.021501-0.020885	5.400000-0.023922-0.018974
5.700000-0.016312-0.023877	5.600000-0.018955-0.022521
5.900000-0.010846-0.025741	5.800000-0.013600-0.024951
6.100000-0.005321-0.026483	6.000000-0.008078-0.026250
6.300000 0.000058-0.026151	6.200000-0.002601-0.026447
6.500000 0.005101-0.024824	6.400000 0.002632-0.029606
6.700000 0.009643-0.022613	6.600000 0.007444-0.023821
6.900000 0.013546-0.019652	6.800000 0.011682-0.021217
7.100000 0.016701-0.016094	7.000000 0.015222-0.017938
7.300000 0.019032-0.012107	7.200000 0.017973-0.014144
7.500000 0.020497-0.007861	7.400000 0.019874-0.010005
7.700000 0.021087-0.003531	7.600000 0.020901-0.005696
7.900000 0.020826 0.000717	7.800000 0.021060-0.001387
8.100000 0.019765 0.004726	8.000000 0.020391 0.002760
8.300000 0.017985 0.008357	8.200000 0.018959 0.006596
8.500000 0.015586 0.011490	8.400000 0.016835 0.009992
8.700000 0.012690 0.014029	8.600000 0.014192 0.012839
8.900000 0.009428 0.015907	8.800000 0.011096 0.015054
9.100000 0.005942 0.017080	9.000000 0.007704 0.016583
9.300000 0.002372 0.017534	9.200000 0.004159 0.017397
9.500000-0.001126 0.017284	9.400000 0.000585 0.017495
9.700000-0.004452 0.016368	9.600000-0.002822 0.016906
9.900000-0.007464 0.014848	9.800000-0.006004 0.015679
	10.000000-0.008821 0.013887

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10.100000-0.010064	0.012808	10.200000-0.011182	0.011622
10.300000-0.012168	0.010345	10.400000-0.013014	0.008990
10.500000-0.013715	0.007571	10.600000-0.014266	0.006104
10.700000-0.014666	0.004604	10.800000-0.014912	0.003087
10.900000-0.015006	0.001566	11.000000-0.014950	0.000058
11.100000-0.014745	-0.001423	11.200000-0.014399	-0.002864
11.300000-0.013915	-0.004291	11.400000-0.013301	-0.003571
11.500000-0.012566	-0.006819	11.600000-0.011719	-0.007967
11.700000-0.010789	-0.009021	11.800000-0.009728	-0.009968
11.900000-0.008607	-0.010800	12.000000-0.007419	-0.011511
12.100000-0.006175	-0.012096	12.200000-0.004888	-0.012551
12.300000-0.003571	-0.012875	12.400000-0.002236	-0.013065
12.500000-0.000892	-0.013123	12.600000-0.000452	-0.013050
12.700000-0.001803	-0.012848	12.800000-0.003226	-0.012522
12.900000-0.007068	-0.012077	13.000000-0.004721	-0.011518
13.100000-0.006057	-0.010854	13.200000-0.007132	-0.010092
13.300000-0.008078	-0.009242	13.400000-0.008914	-0.008312
13.500000-0.009640	-0.007314	13.600000-0.010299	-0.006258
13.700000-0.010755	-0.005155	13.800000-0.011139	-0.004017
13.900000-0.011405	-0.002896	14.000000-0.011582	-0.001682
14.100000-0.011581	-0.000509	14.200000-0.011493	0.000653
14.300000-0.011292	0.001792	14.400000-0.010980	0.002897
14.500000-0.010563	0.003959	14.600000-0.010045	0.004966
14.700000-0.009434	0.005911	14.800000-0.008737	0.006784
14.900000-0.007962	0.007577	15.000000-0.007117	0.008289
15.100000-0.006212	0.008902	15.200000-0.005257	0.009422
15.300000-0.004261	0.009841	15.400000-0.003235	0.010157
15.500000-0.002190	0.010368	15.600000-0.001136	0.010474
15.700000-0.000083	0.010474	15.800000-0.000957	0.010370
15.900000-0.001976	0.010164	16.000000-0.002962	0.009860
16.100000-0.003908	0.009461	16.200000-0.004803	0.008974
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16.500000-0.007111	0.007040	16.600000-0.007731	0.006262
16.700000-0.008267	0.005431	16.800000-0.008715	0.004557
16.900000-0.009072	0.003647	17.000000-0.009334	0.002712
17.100000-0.009501	0.001760	17.200000-0.009572	0.000803
17.300000-0.009547	-0.000152	17.400000-0.009427	-0.001094
17.500000-0.009216	-0.002014	17.600000-0.008915	-0.002904
17.700000-0.008529	-0.003755	17.800000-0.008062	-0.004559
17.900000-0.007521	-0.005309	18.000000-0.006910	-0.005997
18.100000-0.006237	-0.006619	18.200000-0.005510	-0.007168
18.300000-0.004735	-0.007639	18.400000-0.003920	-0.008029
18.500000-0.003075	-0.008336	18.600000-0.002207	-0.008556
18.700000-0.001326	-0.008689	18.800000-0.000439	-0.008734
18.900000-0.000445	-0.008691	19.000000-0.001317	-0.008563
19.100000-0.002170	-0.008351	19.200000-0.002996	-0.008058
19.300000-0.003789	-0.007687	19.400000-0.004543	-0.007245
19.500000-0.005254	-0.006734	19.600000-0.005920	-0.006162
19.700000-0.006546	-0.005555	19.800000-0.007148	-0.004859
19.900000-0.007786	-0.004141	20.000000-0.008760	-0.003389

KA= 0.700000 JMAX= 10 MSTAR= 12

KD RESIJ REACIJ KD RESIJ REACIJ

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1.700000 0.133183 0.005884	1.600000 0.142395-0.009055
1.900000 0.114197 0.029859	1.800000 0.123766 0.018761
2.100000 0.094814 0.047479	2.000000 0.104529 0.039380
2.300000 0.075449 0.059881	2.200000 0.085103 0.054279
2.500000 0.056509 0.067826	2.400000 0.065902 0.064371
2.700000 0.038377 0.071903	2.600000 0.047319 0.070315
2.900000 0.021402 0.072621	2.800000 0.029724 0.072652
3.100000 0.005893 0.070448	3.000000 0.013446 0.071867
3.300000-0.007890 0.065839	3.200000-0.001229 0.068420
3.500000-0.019740 0.059242	3.400000-0.014067 0.062761
3.700000-0.029511 0.051098	3.600000-0.024892 0.055336
3.900000-0.037116 0.041843	3.800000-0.033587 0.046583
4.100000-0.042531 0.031900	4.000000-0.040096 0.036932
4.300000-0.045791 0.021671	4.200000-0.044426 0.026797
4.500000-0.046987 0.011531	4.400000-0.046639 0.016567
4.700000-0.046264 0.001825	4.600000-0.046854 0.006604
4.900000-0.043812-0.007148	4.800000-0.045241-0.002771
5.100000-0.039860-0.015129	5.000000-0.042008-0.011276
5.300000-0.034666-0.021914	5.200000-0.037401-0.018682
5.500000-0.028512-0.027350	5.400000-0.031691-0.024808
5.700000-0.021688-0.031340	5.600000-0.025165-0.029530
5.900000-0.014491-0.033840	5.800000-0.018118-0.032777
6.100000-0.007207-0.034860	6.000000-0.010842-0.034532
6.300000-0.000111-0.034460	6.200000-0.003619-0.034832
6.500000 0.006550-0.032746	6.400000 0.003289-0.033759
6.700000 0.012555-0.029860	6.600000 0.009647-0.031439
6.900000 0.017720-0.025981	6.800000 0.015252-0.028033
7.100000 0.021902-0.021311	7.000000 0.019941-0.023732
7.300000 0.025000-0.016067	7.200000 0.023591-0.018746
7.500000 0.026957-0.010479	7.400000 0.026123-0.013302
7.700000 0.027760-0.004774	7.600000 0.027502-0.007627
7.900000 0.027440 0.000826	7.800000 0.027737-0.001948
8.100000 0.026064 0.006116	8.000000 0.026878 0.003522
8.300000 0.023737 0.010911	8.200000 0.025012 0.008586
8.500000 0.020592 0.015053	8.400000 0.022257 0.013073
8.700000 0.016788 0.018416	8.600000 0.018762 0.016839
8.900000 0.012500 0.020906	8.800000 0.014693 0.019774
9.100000 0.007910 0.022469	9.000000 0.010231 0.021806
9.300000 0.003206 0.023085	9.200000 0.005562 0.022895
9.500000-0.001397 0.022772	9.400000 0.000844 0.023042
9.700000-0.005787 0.021580	9.600000-0.003637 0.022281
9.900000-0.009764 0.019591	9.800000-0.007835 0.020679
	10.000000-0.011556 0.018331

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10.100000-0.013198	0.016914	10.200000-0.014677	0.015357
10.300000-0.015981	0.013679	10.400000-0.017101	0.011896
10.500000-0.018030	0.010030	10.600000-0.018763	0.008100
10.700000-0.019295	0.006126	10.800000-0.019626	0.004127
10.900000-0.019756	0.002125	11.000000-0.019687	0.000137
11.100000-0.019424	-0.001815	11.200000-0.018972	-0.003715
11.300000-0.018340	-0.005344	11.400000-0.017536	-0.007286
11.500000-0.016572	-0.008925	11.600000-0.015459	-0.010448
11.700000-0.014211	-0.011840	11.800000-0.012842	-0.013091
11.900000-0.011367	-0.014192	12.000000-0.009802	-0.015193
12.100000-0.008163	-0.015908	12.200000-0.006466	-0.016513
12.300000-0.004728	-0.016944	12.400000-0.002964	-0.017199
12.500000-0.001185	-0.017280	12.600000	0.000602-0.017188
12.700000	0.002411-0.016927	12.800000	0.004371-0.016502
12.900000	0.010716-0.015919	13.000000	0.005928-0.015188
13.100000	0.007817-0.014317	13.200000	0.009273-0.013317
13.300000	0.010540-0.012199	13.400000	0.011655-0.010978
13.500000	0.012621-0.009665	13.600000	0.013439-0.008276
13.700000	0.014105-0.006825	13.800000	0.014617-0.005327
13.900000	0.014973-0.003798	14.000000	0.015172-0.002253
14.100000	0.015215-0.000707	14.200000	0.015105 0.000823
14.300000	0.014844 0.002324	14.400000	0.014437 0.003781
14.500000	0.013891 0.005181	14.600000	0.013213 0.006509
14.700000	0.012411 0.007755	14.800000	0.011496 0.008907
14.900000	0.010477 0.009955	15.000000	0.009367 0.010890
15.100000	0.008177 0.011705	15.200000	0.006920 0.012392
15.300000	0.005610 0.012947	15.400000	0.004260 0.013367
15.500000	0.002884 0.013648	15.600000	0.001496 0.013790
15.700000	0.000110 0.013793	15.800000	-0.001261 0.013659
15.900000-0.002603	0.013391	16.000000	-0.003903 0.012993
16.100000-0.005149	0.012471	16.200000	-0.006330 0.011831
16.300000-0.007434	0.011082	16.400000	-0.008451 0.010231
16.500000-0.009373	0.009290	16.600000	-0.010191 0.008267
16.700000-0.010899	0.007174	16.800000	-0.011491 0.006024
16.900000-0.011962	0.004826	17.000000	-0.012309 0.003595
17.100000-0.012531	0.002343	17.200000	-0.012629 0.001082
17.300000-0.012594	-0.000175	17.400000	-0.012437-0.001416
17.500000-0.012160	-0.002629	17.600000	-0.011764-0.003802
17.700000-0.011256	-0.004924	17.800000	-0.010642-0.005984
17.900000-0.009929	-0.006973	18.000000	-0.009124-0.007881
18.100000-0.008237	-0.008701	18.200000	-0.007278-0.009426
18.300000-0.006255	-0.010048	18.400000	-0.005181-0.010565
18.500000-0.004065	-0.010970	18.600000	-0.002919-0.011262
18.700000-0.001753	-0.011439	18.800000	-0.000581-0.011500
18.900000	0.000589-0.011446	19.000000	0.001744-0.011279
19.100000	0.002876-0.011002	19.200000	0.003973-0.010618
19.300000	0.005029-0.010132	19.400000	0.006036-0.009551
19.500000	0.006991-0.008880	19.600000	0.007893-0.008128
19.700000	0.008753-0.007303	19.800000	0.009603-0.006414
19.900000	0.010553-0.005469	20.000000	0.012145-0.004480

USL Tech. Memo.
No. 960-17-65

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KA=	0.800000	JMAX=	28	MSTAR=	30	KD	RESIJ	REACIJ
1.700000	0.170252	0.001670		1.600000	0.181933-0.018942			
1.900000	0.146176	0.033967		1.800000	0.158311 0.019101			
2.100000	0.121588	0.057395		2.000000	0.133913 0.046646			
2.300000	0.097017	0.073839		2.200000	0.109268 0.066409			
2.500000	0.072977	0.084433		2.400000	0.084900 0.079811			
2.700000	0.049950	0.090004		2.600000	0.061308 0.087802			
2.900000	0.028381	0.091236		2.800000	0.038958 0.091123			
3.100000	0.008662	0.088748		3.000000	0.018268 0.090420			
3.300000-0.008879	0.083130			3.200000-0.000399	0.086294			
3.500000-0.023980	0.074957			3.400000-0.016748	0.079327			
3.700000-0.036453	0.064795			3.600000-0.030553	0.070089			
3.900000-0.046188	0.053201			3.800000-0.041667	0.059143			
4.100000-0.053154	0.040710			4.000000-0.050016	0.047034			
4.300000-0.057392	0.027835			4.200000-0.055608	0.034290			
4.500000-0.059017	0.015054			4.400000-0.058521	0.021405			
4.700000-0.058212	0.002802			4.600000-0.058905	0.008837			
4.900000-0.055214-0.008538				4.800000-0.056970-0.003004				
5.100000-0.050311-0.018640				5.000000-0.052981-0.013762				
5.300000-0.043831-0.027241				5.200000-0.047247-0.023142				
5.500000-0.036126-0.034149				5.400000-0.040109-0.030916				
5.700000-0.027565-0.039236				5.600000-0.031929-0.036925				
5.900000-0.018520-0.042447				5.800000-0.023080-0.041077				
6.100000-0.009355-0.043792				6.000000-0.013931-0.043349				
6.300000-0.000415-0.043346				6.200000-0.004837-0.043786				
6.500000 0.007984-0.041239				6.400000 0.003870-0.042490				
6.700000 0.015566-0.037652				6.600000 0.011893-0.039617				
6.900000 0.022097-0.032806				6.800000 0.018976-0.035371				
7.100000 0.027394-0.026957				7.000000 0.024909-0.029990				
7.300000 0.031330-0.020379				7.200000 0.029538-0.023741				
7.500000 0.033831-0.013359				7.400000 0.032762-0.016906				
7.700000 0.034879-0.006185				7.600000 0.034535-0.009773				
7.900000 0.034511 0.000865				7.800000 0.034868-0.002628				
8.100000 0.032813 0.007530				8.000000 0.033821 0.004261				
8.300000 0.029914 0.013577				8.200000 0.031504 0.010644				
8.500000 0.025982 0.018807				8.400000 0.028065 0.016306				
8.700000 0.021216 0.023659				8.600000 0.023690 0.021064				
8.900000 0.015835 0.026217				8.800000 0.018588 0.024780				
9.100000 0.010072 0.028208				9.000000 0.012986 0.027361				
9.300000 0.004163 0.029009				9.200000 0.007121 0.028757				
9.500000-0.001658 0.028639				9.400000 0.001228 0.028967				
9.700000-0.007173 0.027162				9.600000-0.004467 0.028034				
9.900000-0.012182 0.024681				9.800000-0.009753 0.026040				
				10.000000-0.014444 0.023105				

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10.100000-0.016516 0.021331	10.200000-0.018384 0.019380
10.300000-0.020033 0.017275	10.400000-0.021451 0.019039
10.500000-0.022629 0.012696	10.600000-0.023560 0.010272
10.700000-0.024240 0.007791	10.800000-0.024666 0.005280
10.900000-0.024840 0.002761	11.000000-0.024764 0.000262
11.100000-0.024443-0.002195	11.200000-0.023885-0.004586
11.300000-0.023101-0.006889	11.400000-0.022100-0.009083
11.500000-0.020898-0.011149	11.600000-0.019509-0.013068
11.700000-0.017950-0.014824	11.800000-0.016239-0.016404
11.900000-0.014396-0.017794	12.000000-0.012441-0.018984
12.100000-0.010394-0.019965	12.200000-0.008278-0.020732
12.300000-0.006114-0.021281	12.400000-0.003925-0.021610
12.500000-0.001732-0.021718	12.600000 0.000444-0.021609
12.700000 0.002581-0.021288	12.800000 0.004659-0.020759
12.900000 0.006658-0.020033.	13.000000 0.008560-0.019119
13.100000 0.010348-0.018029	13.200000 0.012006-0.016777
13.300000 0.013520-0.015376	13.400000 0.014876-0.013844
13.500000 0.016065-0.012197	13.600000 0.017077-0.010453
13.700000 0.017904-0.008631	13.800000 0.018541-0.006749
13.900000 0.018985-0.004828	14.000000 0.019234-0.002886
14.100000 0.019288-0.000943	14.200000 0.019150 0.000982
14.300000 0.018823 0.002870	14.400000 0.018314 0.004703
14.500000 0.017630 0.006465	14.600000 0.016780 0.008138
14.700000 0.015775 0.009707	14.800000 0.014626 0.011158
14.900000 0.013348 0.012479	15.000000 0.011954 0.013659
15.100000 0.010460 0.014686	15.200000 0.008881 0.015555
15.300000 0.007235 0.016257	15.400000 0.005539 0.016789
15.500000 0.003809 0.017147	15.600000 0.002064 0.017330
15.700000 0.000320 0.017338	15.800000-0.001405 0.017173
15.900000-0.003094 0.016841	16.000000-0.004731 0.016344
16.100000-0.006300 0.015692	16.200000-0.007788 0.014891
16.300000-0.009180 0.013953	16.400000-0.010463 0.012887
16.500000-0.011627 0.011705	16.600000-0.012662 0.010422
16.700000-0.013558 0.009051	16.800000-0.014308 0.007606
16.900000-0.014908 0.006102	17.000000-0.015352 0.004555
17.100000-0.015638 0.002981	17.200000-0.015765 0.001396
17.300000-0.015734-0.000184	17.400000-0.015547-0.001745
17.500000-0.015208-0.003270	17.600000-0.014721-0.004746
17.700000-0.014093-0.006158	17.800000-0.013332-0.007492
17.900000-0.012447-0.008737	18.000000-0.011448-0.009882
18.100000-0.010346-0.010915	18.200000-0.009154-0.011828
18.300000-0.007883-0.012614	18.400000-0.006548-0.013266
18.500000-0.005162-0.013779	18.600000-0.003740-0.014149
18.700000-0.002296-0.014374	18.800000-0.00084414.000000
18.900000 0.00060188.000000	19.000000 0.00202489.000000
19.100000 0.00341390.000000	19.200000 0.00475354.000000
19.300000 0.006032-0.012749	19.400000 0.007237-0.012020
19.500000 0.008358-0.011179	19.600000 0.009385-0.010236
19.700000 0.010308-0.009201	19.800000 0.011119-0.008084
19.900000 0.011811-0.006898	20.000000 0.012378-0.005656

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KA= 0.900000 JMAX= 16 MSTAR= 16
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2.500000	0.091185	0.100960	2.400000	0.105795	0.094928
2.700000	0.062959	0.108388	2.600000	0.076883	0.105407
2.900000	0.036502	0.110378	2.800000	0.049477	0.110012
3.100000	0.012294	0.107729	3.000000	0.024090	0.109586
3.300000-0.009262	0.101185		3.200000	0.001162	0.104898
3.500000-0.027846	0.091464		3.400000-0.018942		0.096677
3.700000-0.043228	0.079269		3.600000-0.035948		0.085633
3.900000-0.055272	0.065284		3.800000-0.049672		0.072459
4.100000-0.063936	0.050169		4.000000-0.060026		0.057828
4.300000-0.069271	0.034553		4.200000-0.067013		0.042386
4.500000-0.071414	0.019023		4.400000-0.070730		0.026743
4.700000-0.070586	0.004111		4.600000-0.071355		0.011458
4.900000-0.067074-0.009712			4.800000-0.069145-0.002963		
5.100000-0.061229-0.022045			5.000000-0.064420-0.016086		
5.300000-0.053448-0.032567			5.200000-0.057555-0.027549		
5.500000-0.044160-0.041038			5.400000-0.048965-0.037070		
5.700000-0.033813-0.047302			5.600000-0.039091-0.044452		
5.900000-0.022861-0.051288			5.800000-0.028385-0.049581		
6.100000-0.011747-0.053007			6.000000-0.017297-0.052427		
6.300000-0.000890-0.052546			6.200000-0.006261-0.053041		
6.500000-0.009323-0.050061			6.400000-0.004319-0.051544		
6.700000-0.018554-0.045772			6.600000-0.014081-0.048127		
6.900000-0.026519-0.039946			6.800000-0.022710-0.043032		
7.100000-0.032993-0.032890			7.000000-0.029953-0.036551		
7.300000-0.037818-0.024940			7.200000-0.035619-0.029006		
7.500000-0.040904-0.016443			7.400000-0.039581-0.020738		
7.700000-0.042228-0.007748			7.600000-0.041785-0.012099		
7.900000-0.041832-0.000805			7.800000-0.042240-0.003434		
8.100000-0.039818-0.008900			8.000000-0.041019-0.004928		
8.300000-0.036344-0.016254			8.200000-0.038252-0.012686		
8.500000-0.031610-0.022622			8.400000-0.034120-0.019575		
8.700000-0.025858-0.027809			8.600000-0.028845-0.025373		
8.900000-0.019353-0.031671			8.800000-0.022682-0.029913		
9.100000-0.012377-0.034121			9.000000-0.015906-0.033076		
9.300000-0.005218-0.035127			9.200000-0.008803-0.034805		
9.500000-0.001842-0.034713			9.400000-0.001659-0.035094		
9.700000-0.008537-0.032955			9.600000-0.005251-0.033996		
9.900000-0.014625-0.029975			9.800000-0.011671-0.031608		
			10.000000-0.017374-0.028077		

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COLUMBIA UNIVERSITY
KIDS N LABORATORIES
CONTRACT Korr-266(84)

10.100000-0.019896	0.025937	10.200000-0.022171	0.023583
10.300000-0.024181	0.021040	10.400000-0.025912	0.018337
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10.700000-0.029330	0.009566	10.800000-0.029860	0.006523
10.900000-0.030083	0.003472	11.000000-0.030004	0.000442
11.100000-0.029627	-0.002538	11.200000-0.028963	-0.005439
11.300000-0.028023	-0.008234	11.400000-0.026821	-0.010898
11.500000-0.025374	-0.013408	11.600000-0.023700	-0.015741
11.700000-0.021818	-0.017877	11.800000-0.019752	-0.019799
11.900000-0.017525	-0.021492	12.000000-0.015160	-0.022943
12.100000-0.012685	-0.024142	12.200000-0.010124	-0.025082
12.300000-0.007504	-0.025757	12.400000-0.004851	-0.026165
12.500000-0.002194	-0.026306	12.600000	0.000443-0.026183
12.700000	0.003034-0.025803	12.800000	0.005555-0.025172
12.900000	0.007980-0.024300	13.000000	0.010290-0.023200
13.100000	0.012461-0.021887	13.200000	0.014476-0.020376
13.300000	0.016316-0.018685	13.400000	0.017966-0.016834
13.500000	0.019414-0.014843	13.600000	0.020647-0.012734
13.700000	0.021657-0.010529	13.800000	0.022436-0.008251
13.900000	0.022982-0.005925	14.000000	0.023291-0.003572
14.100000	0.023364-0.001218	14.200000	0.023204 0.001115
14.300000	0.022815 0.003405	14.400000	0.022205 0.005628
14.500000	0.021363 0.007765	14.600000	0.020359 0.009795
14.700000	0.019146 0.011701	14.800000	0.017760 0.013464
14.900000	0.016215 0.015069	15.000000	0.014530 0.016504
15.100000	0.012723 0.017755	15.200000	0.010812 0.018813
15.300000	0.008818 0.019670	15.400000	0.006762 0.020320
15.500000	0.004662 0.020760	15.600000	0.002532 0.020987
15.700000	0.000269 0.021003	15.800000-0.001583	0.020810
15.900000-0.003660	0.020413	16.000000-0.005653	0.019817
16.100000-0.007561	0.019032	16.200000-0.009368	0.018067
16.300000-0.011059	0.016934	16.400000-0.012618	0.015647
16.500000-0.014032	0.014220	16.600000-0.015290	0.012668
16.700000-0.016379	0.011009	16.800000-0.017293	0.009261
16.900000-0.018023	0.007441	17.000000-0.018565	0.005568
17.100000-0.018916	0.003662	17.200000-0.019073	0.001742
17.300000-0.019039	-0.000173	17.400000-0.018816	-0.002065
17.500000-0.018407	-0.003914	17.600000-0.017819	-0.005704
17.700000-0.017059	-0.007416	17.800000-0.016138	-0.009035
17.900000-0.015065	-0.010546	18.000000-0.013853	-0.011936
18.100000-0.012515	-0.013191	18.200000-0.011065	-0.014302
18.300000-0.00519	-0.015258	18.400000-0.007892	-0.016051
18.500000-0.006	0-0.016677	18.600000-0.004460	-0.017129
18.700000-0.002686	-0.017407	18.800000-0.000892	-0.017508
18.900000	0.000910-0.17434	19.000000	0.002720-0.017187
19.100000	0.004566-0.01672	19.200000	0.006623-0.016194
19.300000	0.012595-0.015461	19.400000	0.007178-0.014582
19.500000	0.009376-0.01367	19.600000	0.010857-0.012427
19.700000	0.012087-0.01175	19.800000	0.013136-0.009824
19.900000	0.014019-0.00839	20.000000	0.014738-0.006886

KA= 1.000000 JMAX= 20 MSTAR= 30
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2.500000 0.110977 0.116560	2.400000 0.128372 0.108810
2.700000 0.077355 0.126307	2.600000 0.093944 0.122338
2.900000 0.045819 0.129378	2.800000 0.061289 0.128610
3.100000 0.016935 0.126796	3.000000 0.031013 0.128734
3.300000-0.008815 0.119487	3.200000 0.003642 0.123677
3.500000-0.031051 0.108327	3.400000-0.020392 0.114335
3.700000-0.049499 0.094166	3.600000-0.040761 0.101570
3.900000-0.063994 0.077824	3.800000-0.057246 0.086217
4.100000-0.074484 0.060093	4.000000-0.069739 0.069084
4.300000-0.081028 0.041723	4.200000-0.078242 0.050943
4.500000-0.083786 0.023413	4.400000-0.082866 0.032519
4.700000-0.083014 0.005800	4.600000-0.083822 0.014483
4.900000-0.079054-0.010555	4.800000-0.081409-0.002567
5.100000-0.072316-0.029176	5.000000-0.076004-0.018109
5.300000-0.063269-0.037676	5.200000-0.068050-0.031711
5.500000-0.052418-0.047769	5.400000-0.058036-0.049036
5.700000-0.040295-0.055267	5.600000-0.046482-0.051850
5.900000-0.027434-0.060082	5.800000-0.033923-0.058011
6.100000-0.014359-0.062222	6.000000-0.020891-0.061482
6.300000-0.001567-0.061787	6.200000-0.007898-0.062317
6.500000 0.010484-0.058961	6.400000 0.004577-0.060659
6.700000 0.021394-0.053997	6.600000 0.016105-0.056727
6.900000 0.030824-0.047210	6.800000 0.026312-0.050809
7.100000 0.038507-0.038961	7.000000 0.034897-0.043244
7.300000 0.044255-0.029645	7.200000 0.041631-0.034411
7.500000 0.047958-0.019670	7.400000 0.046365-0.024714
7.700000 0.049586-0.009448	7.600000 0.049030-0.014564
7.900000 0.049188 0.000620	7.800000 0.049635-0.004371
8.100000 0.046880 0.010161	8.000000 0.048263 0.005478
8.300000 0.042847 0.018839	8.200000 0.045066 0.014627
8.500000 0.037325 0.026366	8.400000 0.040255 0.022762
8.700000 0.030594 0.032509	8.600000 0.034091 0.029623
8.900000 0.022969 0.037098	8.800000 0.026873 0.035006
9.100000 0.014780 0.040027	9.000000 0.018923 0.038774
9.300000 0.006365 0.041258	9.200000 0.010580 0.040855
9.500000-0.001941 0.040817	9.400000 0.002178 0.041243
9.700000-0.009827 0.038792	9.600000-0.005955 0.039995
9.900000-0.017006 0.035325	9.800000-0.013521 0.037227
	10.000000-0.020251 0.033109

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10.100000-0.023230	0.030608	10.200000-0.025919	0.027853
10.300000-0.028298	0.024874	10.400000-0.030350	0.021705
10.500000-0.032060	0.018382	10.600000-0.033419	0.014938
10.700000-0.034420	0.011411	10.800000-0.035060	0.007836
10.900000-0.035340	0.004249	11.000000-0.035263	0.000686
11.100000-0.034837-0.002820		11.200000-0.034072-0.006235	
11.300000-0.032982-0.009527		11.400000-0.031583-0.012666	
11.500000-0.029894-0.015624		11.600000-0.027938-0.018376	
11.700000-0.025737-0.020898		11.800000-0.023318-0.023169	
11.900000-0.020708-0.025171		12.000000-0.017935-0.026889	
12.100000-0.015030-0.028311		12.200000-0.012024-0.029429	
12.300000-0.008947-0.030235		12.400000-0.005831-0.030728	
12.500000-0.002707-0.030907		12.600000 0.000394-0.030776	
12.700000 0.003443-0.030341		12.800000 0.006409-0.029610	
12.900000 0.009265-0.028597		13.000000 0.011985-0.027315	
13.100000 0.014544-0.025781		13.200000 0.016919-0.024014	
13.300000 0.019090-0.022035		13.400000 0.021039-0.019866	
13.500000 0.022750-0.017532		13.600000 0.024209-0.015058	
13.700000 0.025406-0.012470		13.800000 0.026332-0.009796	
13.900000 0.026984-0.007063		14.000000 0.027358-0.004299	
14.100000 0.027454-0.001532		14.200000 0.027276 0.001211	
14.300000 0.026829 0.003904		14.400000 0.026121 0.006521	
14.500000 0.025163 0.009036		14.600000 0.023968 0.011427	
14.700000 0.022551 0.013672		14.800000 0.020929 0.015750	
14.900000 0.019121 0.017644		15.000000 0.017146 0.019337	
15.100000 0.015027 0.020814		15.200000 0.012787 0.022066	
15.300000 0.010448 0.023081		15.400000 0.008037 0.023854	
15.500000 0.005576 0.024379		15.600000 0.003092 0.024655	
15.700000 0.000608 0.024682		15.800000-0.001850 0.024463	
15.900000-0.004258 0.024003		16.000000-0.006594 0.023311	
16.100000-0.008835 0.022395		16.200000-0.010961 0.021268	
16.300000-0.012951 0.019942		16.400000-0.014788 0.018435	
16.500000-0.016456 0.016763		16.600000-0.017940 0.014944	
16.700000-0.019227 0.012998		16.800000-0.020308 0.010946	
16.900000-0.021174 0.008809		17.000000-0.021819 0.006610	
17.100000-0.022239 0.004371		17.200000-0.022433 0.002114	
17.300000-0.000000-0.000137		17.40000015.000000-0.002361	
17.50.000038.000000-0.004536		17.60000053.000000-0.006641	
17.76.000016.000000-0.008657		17.80000025.000000-0.010563	
17.90000040.000000-0.012343		18.00000017.000000-0.013980	
18.10000047.000000-0.015460		18.20000068.000000-0.016770	
18.30000021.000000-0.017899		18.40000023.00000074.000000	
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18.70000018.00000087.000000		18.80000048.00000085.000000	
18.90000051.00000070.000000		19.00000055.00000018.000000	
19.10000053.00000008.000000		19.20000020.00000074.000000	
19.30000039.00000037.000000		19.40000063.00000022.000000	
19.50000024.00000046.000000		19.60000030.00000096.000000	
19.70000082.00000003.000000		19.80000007.00000008.000000	
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3.100000 0.029805 0.162604	3.000000 0.048544 0.164203
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3.500000-0.034324 0.141242	3.400000-0.020033 0.148517
3.700000-0.059163 0.123703	3.600000-0.047378 0.132923
3.900000-0.078841 0.103106	3.800000-0.069655 0.113719
4.100000-0.093283 0.080518	4.000000-0.086716 0.091997
4.300000-0.102554 0.056941	4.200000-0.098555 0.068793
4.500000-0.106859 0.033309	4.400000-0.105310 0.045077
4.700000-0.106522 0.010468	4.600000-0.107246 0.021741
4.900000-0.101982-0.010837	4.800000-0.104746-0.000419
5.100000-0.093768-0.029969	5.000000-0.098298-0.020710
5.300000-0.082486-0.046414	5.200000-0.088471-0.038555
5.500000-0.068790-0.059783	5.400000-0.075897-0.053502
5.700000-0.053369-0.069821	5.600000-0.061252-0.065230
5.900000-0.036918-0.076400	5.800000-0.045229-0.073546
6.100000-0.020120-0.079520	6.000000-0.028521-0.078388
6.300000-0.003623-0.079301	6.200000-0.011795-0.079816
6.500000 0.011977-0.075969	6.400000 0.004324-0.078006
6.700000 0.026151-0.069847	6.600000 0.019272-0.073234
6.900000 0.038456-0.061335	6.800000 0.032562-0.065862
7.100000 0.048539-0.050897	7.000000 0.043793-0.056326
7.300000 0.056147-0.039037	7.200000 0.052664-0.045112
7.500000 0.061131-0.026283	7.400000 0.058972-0.032738
7.700000 0.063444-0.013169	7.600000 0.062620-0.019738
7.900000 0.063140-0.000210	7.800000 0.063612-0.006639
8.100000 0.060366 0.012106	8.000000 0.062050 0.006057
8.300000 0.055351 0.023344	8.200000 0.058121 0.017885
8.500000 0.048396 0.033127	8.400000 0.052094 0.028438
8.700000 0.039859 0.041150	8.600000 0.044301 0.037375
8.900000 0.030141 0.047187	8.800000 0.035122 0.044428
9.100000 0.019669 0.051098	9.000000 0.024973 0.049414
9.300000 0.008879 0.052827	9.200000 0.014287 0.052236
9.500000-0.001803 0.052402	9.400000 0.003498 0.052879
9.700000-0.011968 0.049932	9.600000-0.006974 0.051419
9.900000-0.021247 0.045595	9.800000-0.016739 0.047983
	10.000000-0.025451 0.042801

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10.100000-0.029318	0.039636	10.200000-0.032816	0.036139
10.300000-0.035918	0.032350	10.400000-0.038602	0.028312
10.500000-0.040849	0.024069	10.600000-0.042647	0.019667
10.700000-0.043986	0.015152	10.800000-0.044861	0.010570
10.900000-0.045273	0.005968	11.000000-0.045226	0.001391
11.100000-0.044730	-0.003117	11.200000-0.043796	-0.007513
11.300000-0.042443	-0.011756	11.400000-0.040691	-0.015806
11.500000-0.038564	-0.019628	11.600000-0.036090	-0.023189
11.700000-0.033298	-0.026456	11.800000-0.030223	-0.029405
11.900000-0.026899	-0.032010	12.000000-0.023362	-0.034253
12.100000-0.019651	-0.036118	12.200000-0.015806	-0.037592
12.300000-0.011867	-0.038667	12.400000-0.007873	-0.039339
12.500000-0.003865	-0.039609	12.600000	0.000118-0.039480
12.700000	0.004036-0.038960	12.800000	0.007853-0.038060
12.900000	0.011531-0.036794	13.000000	0.015038-0.035182
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13.300000	0.024223-0.028490	13.400000	0.026750-0.025730
13.500000	0.028973-0.022754	13.600000	0.030875-0.019596
13.700000	0.032441-0.016288	13.800000	0.033661-0.012867
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14.100000	0.035194-0.002274	14.200000	0.034996 0.001249
14.300000	0.034453 0.004710	14.400000	0.033573 0.008076
14.500000	0.032372 0.011315	14.600000	0.030865 0.014396
14.700000	0.029070 0.017292	14.800000	0.027011 0.019976
14.900000	0.024710 0.022426	15.000000	0.022194 0.024619
15.100000	0.019491 0.026538	15.200000	0.016629 0.028167
15.300000	0.013639 0.029494	15.400000	0.010552 0.030510
15.500000	0.007400 0.031209	15.600000	0.004215 0.031588
15.700000	0.001029 0.031648	15.800000	-0.002127 0.031392
15.900000	-0.005222 0.030827	16.000000	-0.008226 0.029961
16.100000	-0.011111 0.028808	16.200000	-0.013850 0.027382
16.300000	-0.016416 0.025702	16.400000	-0.018788 0.023785
16.500000	-0.020944 0.021656	16.600000	-0.022865 0.019336
16.700000	-0.024536 0.016851	16.800000	-0.025942 0.014229
16.900000	-0.027073 0.011495	17.000000	-0.027921 0.008680
17.100000	-0.028481 0.005811	17.200000	-0.028750 0.002918
17.300000	-0.028731 0.000029	17.400000	-0.028425-0.002827
17.500000	-0.027840-0.005621	17.600000	-0.026984-0.008328
17.700000	-0.025869-0.010922	17.800000	-0.024509-0.013377
17.900000	-0.022920-0.015672	18.000000	-0.021121-0.017785
18.100000	-0.019131-0.019697	18.200000	-0.016973-0.021392
18.300000	-0.014669-0.022856	18.400000	-0.012244-0.024076
18.500000	-0.009723-0.025043	18.600000	-0.007133-0.025750
18.700000	-0.004500-0.026193	18.800000	-0.001850-0.026370
18.900000	-0.000791-0.026283	19.000000	0.003396-0.025935
19.100000	0.005939-0.025332	19.200000	0.008397-0.024483
19.300000	0.010746-0.023399	19.400000	0.012963-0.022094
19.500000	0.015029-0.020581	19.600000	0.016923-0.018879
19.700000	0.018630-0.017007	19.800000	0.020134-0.014984
19.900000	0.021422-0.012832	20.000000	0.022484-0.010574

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2.900000 0.081384	0.177887	2.800000 0.104406	0.174386
3.100000 0.038286	0.177938	3.000000 0.059314	0.178989
3.300000-0.000312	0.170230	3.200000 0.018386	0.174953
3.500000-0.033846	0.156303	3.400000-0.017741	0.163954
3.700000-0.061906	0.137540	3.600000-0.048580	0.147444
3.900000-0.084240	0.115228	3.800000-0.073798	0.126750
4.100000-0.100760	0.090576	4.000000-0.093226	0.103122
4.300000-0.111533	0.064719	4.200000-0.106853	0.077730
4.500000-0.116780	0.038705	4.400000-0.114828	0.051670
4.700000-0.116857	0.013485	4.600000-0.117437	0.025941
4.900000-0.112243-0.010103		4.800000-0.115102	0.001440
5.100000-0.103524-0.031344		5.000000-0.108357-0.021056	
5.300000-0.091364-0.049658		5.200000-0.097830-0.040898	
5.500000-0.076488-0.064609		5.400000-0.084218-0.057576	
5.700000-0.059657-0.075901		5.600000-0.068269-0.070725	
5.900000-0.041638-0.083388		5.800000-0.050748-0.080124	
6.100000-0.023189-0.087061		6.000000-0.032422-0.085697	
6.300000-0.005029-0.087045		6.200000-0.014030-0.087502	
6.500000 0.012181-0.083584		6.400000 0.003734-0.085725	
6.700000 0.027855-0.077027		6.600000 0.020243-0.080667	
6.900000 0.041495-0.067815		6.800000 0.034956-0.072723	
7.100000 0.052710-0.056453		7.000000 0.047426-0.062369	
7.300000 0.061213-0.043497		7.200000 0.057314-0.050139	
7.500000 0.066836-0.029529		7.400000 0.064391-0.038603	
7.700000 0.069522-0.015134		7.600000 0.068545-0.022348	
7.900000 0.069325-0.000884		7.800000 0.069777-0.007957	
8.100000 0.066402 0.012684		8.000000 0.068191 0.006017	
8.300000 0.061001 0.025087		8.200000 0.063992 0.019059	
8.500000 0.053452 0.035908		8.400000 0.057472 0.030719	
8.700000 0.044146 0.044806		8.600000 0.048992 0.040615	
8.900000 0.033522 0.051532		8.800000 0.038970 0.048453	
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9.300000 0.010207 0.057920		9.200000 0.016145 0.057222	
9.500000-0.001533 0.057545		9.400000 0.004296 0.058023	
9.700000-0.012723 0.054916		9.600000-0.007223 0.056502	
9.900000-0.022953 0.050229		9.800000-0.017982 0.052815	
		10.000000-0.027595 0.047193	

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10.100000-0.031869	0.043747	10.200000-0.035740	0.039993
10.300000-0.039178	0.035795	10.400000-0.042158	0.031379
10.500000-0.044659	0.026736	10.600000-0.046668	0.021914
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10.900000-0.049655	0.006886	11.000000-0.049638	0.001857
11.100000-0.049125	-0.003098	11.200000-0.048132	-0.007933
11.300000-0.046676	-0.012603	11.400000-0.044780	-0.017065
11.500000-0.042470	-0.021278	11.600000-0.039778	-0.025205
11.700000-0.036734	-0.028814	11.800000-0.033377	-0.032073
11.900000-0.029743	-0.034958	12.000000-0.025874	-0.037445
12.100000-0.021811	-0.039517	12.200000-0.017598	-0.041161
12.300000-0.013278	-0.042368	12.400000-0.008896	-0.043193
12.500000-0.004496	-0.043455	12.600000-0.000122	-0.043338
12.700000	0.004185-0.042792	12.800000	0.008382-0.041827
12.900000	0.012430-0.040461	13.000000	0.016291-0.038712
13.100000	0.019931-0.036604	13.200000	0.023316-0.034163
13.300000	0.026418-0.031419	13.400000	0.029210-0.028403
13.500000	0.031669-0.025148	13.600000	0.033775-0.021691
13.700000	0.035515-0.018069	13.800000	0.036875-0.014319
13.900000	0.037847-0.010481	14.000000	0.038429-0.006593
14.100000	0.038619-0.002695	14.200000	0.038422
14.300000	0.037844	0.004978	0.001174
14.500000	0.035596	0.012241	0.008678
14.700000	0.032003	0.018823	0.015633
14.900000	0.027244	0.024483	0.021782
15.100000	0.021535	0.029026	0.026903
15.300000	0.015125	0.032303	0.030830
15.500000	0.008284	0.034219	0.033435
15.700000	0.001290	0.034733	0.034651
15.900000-0.005577	0.033863	15.800000-0.002176	0.034468
16.100000-0.012053	0.031676	16.000000-0.008880	0.032928
16.300000-0.017893	0.028291	16.200000-0.015067	0.030124
16.500000-0.022884	0.023871	16.400000-0.020507	0.026199
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16.900000-0.029662	0.012745	16.800000-0.028407	0.015741
17.100000-0.031234	0.006511	17.000000-0.030606	0.009658
17.300000-0.031536	0.000164	17.200000-0.031544	0.003336
17.500000-0.030583	-0.006044	17.400000-0.031213	-0.002973
17.700000-0.028444	-0.011872	17.600000-0.029656	-0.009020
17.900000-0.025228	-0.017100	17.800000-0.026962	-0.014574
18.100000-0.021085	-0.021536	18.000000-0.023261	-0.019428
18.300000-0.016200	-0.025023	18.200000-0.018723	-0.023406
18.500000-0.010780	-0.027445	18.400000-0.013543	-0.026373
18.700000-0.005050	-0.028730	18.600000-0.007940	-0.028239
18.900000	0.000758-0.028852	18.800000-0.002142	-0.028936
19.100000	0.006414-0.027829	19.000000	0.003619-0.028480
19.300000	0.011698-0.025728	19.200000	0.009115-0.026908
19.500000	0.016412-0.022651	19.400000	0.014138-0.024303
19.700000	0.020380-0.018742	19.600000	0.018499-0.020791
19.900000	0.023462-0.014170	19.800000	0.022039-0.016527
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KA= 1.400000 JMAX= 26 MSTAR= 28

KD RESTIJ REACTIJ KD RESIJ REACTIJ

2.900000 0.095867 0.188129	2.800000 0.121264 0.182681
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3.300000 0.005565 0.183719	3.200000 0.026264 0.188123
3.500000-0.031629 0.169738	3.400000-0.013754 0.177521
3.700000-0.062858 0.150196	3.600000-0.048011 0.160567
3.900000-0.087842 0.126567	3.800000-0.076141 0.138805
4.100000-0.106477 0.100214	4.000000-0.097953 0.113650
4.300000-0.118831 0.072403	4.200000-0.113428 0.086416
4.500000-0.125136 0.044299	4.400000-0.122719 0.058319
4.700000-0.125776 0.016955	4.600000-0.126135 0.030471
4.900000-0.121268-0.008702	4.800000-0.124128 0.003863
5.100000-0.112242-0.031879	5.000000-0.117276-0.020644
5.300000-0.099421-0.051934	5.200000-0.106258-0.042331
5.500000-0.083589-0.068378	5.400000-0.091830-0.060632
5.700000-0.065573-0.080882	5.600000-0.074802-0.075137
5.900000-0.046209-0.089273	5.800000-0.056008-0.085596
6.100000-0.026319-0.093533	6.000000-0.036280-0.091915
6.300000-0.006688-0.093789	6.200000-0.016425-0.094149
6.500000 0.011962-0.090298	6.400000 0.002802-0.092491
6.700000 0.028990-0.083433	6.600000 0.020715-0.087260
6.900000 0.043851-0.073665	6.800000 0.036721-0.078879
7.100000 0.056114-0.061539	7.000000 0.050330-0.067860
7.300000 0.065463-0.047654	7.200000 0.061167-0.054777
7.500000 0.071707-0.032638	7.400000 0.068980-0.040247
7.700000 0.074779-0.017126	7.600000 0.073639-0.024904
7.900000 0.074732-0.001738	7.800000 0.075138-0.009379
8.100000 0.071729 0.012943	8.000000 0.073585 0.005725
8.300000 0.066035 0.026392	8.200000 0.069198 0.019852
8.500000 0.058001 0.038152	8.400000 0.062286 0.032508
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8.900000 0.036653 0.055220	8.800000 0.042501 0.051842
9.100000 0.024315 0.060075	9.000000 0.030569 0.057968
9.300000 0.011555 0.062343	9.200000 0.017956 0.061533
9.500000-0.001117 0.062049	9.400000 0.005177 0.062511
9.700000-0.013216 0.059316	9.600000-0.007267 0.060977
9.900000-0.024297 0.054351	9.800000-0.018909 0.057097
	10.000000-0.029332 0.051118

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10.700000-0.051790	0.018683	10.800000-0.052905	0.013269	
10.900000-0.053472	0.007823	11.000000-0.053493	0.002398	
11.100000-0.052980	-0.002951	11.200000-0.051946	-0.008175	
11.300000-0.050412	-0.013224	11.400000-0.048402	-0.018051	
11.500000-0.045943	-0.022613	11.600000-0.043069	-0.026870	
11.700000-0.039813	-0.030785	11.800000-0.036216	-0.034326	
11.900000-0.032319	-0.037463	12.000000-0.028164	-0.040175	
12.100000-0.023797	-0.042439	12.200000-0.019264	-0.044243	
12.300000-0.014614	-0.045575	12.400000-0.009894	-0.046431	
12.500000-0.005150	-0.046810	12.600000-0.000431	-0.046715	
12.700000	0.004217-0.046155	12.800000	0.008750-0.045144	
12.900000	0.013125-0.043698	13.000000	0.017301-0.041838	
13.100000	0.021240-0.039589	13.200000	0.024907-0.036979	
13.300000	0.028270-0.034040	13.400000	0.031300-0.030806	
13.500000	0.033973-0.027312	13.600000	0.036268-0.023598	
13.700000	0.038167-0.019702	13.800000	0.039657-0.015667	
13.900000	0.040730-0.011534	14.000000	0.041382-0.007346	
14.100000	0.041611-0.003144	14.200000	0.041422-0.001030	
14.300000	0.040822	0.005135	14.400000	0.039824-0.009191
14.500000	0.038442	0.012981	14.600000	0.036696-0.016649
14.700000	0.034608	0.020100	14.800000	0.032202-0.023303
14.900000	0.029509	0.026231	15.000000	0.026557-0.028858
15.100000	0.023379	0.031163	15.200000	0.020010-0.033126
15.300000	0.016486	0.034733	15.400000	0.012844-0.035972
15.500000	0.009121	0.036837	15.600000	0.005354-0.037323
15.700000	0.001583	0.037431	15.800000	0.002156-0.037165
15.900000	-0.005827	0.036530	16.000000	-0.009393-0.035540
16.100000	-0.012821	0.034208	16.200000	-0.016079-0.032551
16.300000	-0.019136	0.030590	16.400000	-0.021965-0.028348
16.500000	-0.024541	0.025850	16.600000	-0.026840-0.023125
16.700000	-0.028845	0.020202	16.800000	-0.030538-0.017113
16.900000	-0.031906	0.013890	17.000000	-0.032940-0.010566
17.100000	-0.033633	0.007177	17.200000	-0.033983-0.009755
17.300000	-0.033990	0.000335	17.400000	-0.033658-0.003048
17.500000	-0.032995	-0.006363	17.600000	-0.032010-0.009576
17.700000	-0.030717	-0.012657	17.800000	-0.029132-0.019577
17.900000	-0.027275	-0.018309	18.000000	-0.025166-0.020828
18.100000	-0.022830	-0.023112	18.200000	-0.020292-0.025140
18.300000	-0.017580	-0.026895	18.400000	-0.014722-0.028362
18.500000	-0.011748	-0.029532	18.600000	-0.008689-0.030394
18.700000	-0.005577	-0.030943	18.800000	-0.002442-0.031179
18.900000	-0.000684	-0.031101	19.000000	-0.003770-0.030714
19.100000	-0.006787	-0.030025	19.200000	-0.009704-0.029044
19.300000	-0.012494	-0.027783	19.400000	-0.015130-0.026256
19.500000	-0.017589	-0.024488	19.600000	-0.019847-0.022491
19.700000	-0.021884	-0.020291	19.800000	-0.023682-0.017910
19.900000	-0.025227	-0.015375	20.000000	-0.026504-0.012712

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KA= 1.500000 JMAX= 26 MSTAR= 30

KD RESIJ REACIJ KD RESIJ REACIJ

3.100000 0.059835	0.199300	3.000000 0.085148	0.197796
3.300000 0.013232	0.194352	3.200000 0.035834	0.198025
3.500000-0.027466	0.180988	3.400000-0.007890	0.188585
3.700000-0.061764	0.161230	3.600000-0.045438	0.171797
3.900000-0.089354	0.136782	3.800000-0.076409	0.149493
4.100000-0.110117	0.109178	4.000000-0.100589	0.123284
4.300000-0.124118	0.079821	4.200000-0.117952	0.094635
4.500000-0.131598	0.049992	4.400000-0.128651	0.064890
4.700000-0.132962	0.020845	4.600000-0.133013	0.035267
4.900000-0.128756-0.006605		4.800000-0.131316	0.006890
5.100000-0.119654-0.031492		5.000000-0.124771-0.019417	
5.300000-0.106422-0.053113		5.200000-0.113503-0.042749	
5.500000-0.089899-0.070928		5.400000-0.098517-0.062523	
5.700000-0.070969-0.084572		5.600000-0.080679-0.078288	
5.900000-0.050525-0.093847		5.800000-0.060880-0.089761	
6.100000-0.029450-0.098723		6.000000-0.040013-0.096831	
6.300000-0.008586-0.099322		6.200000-0.018941-0.099543	
6.500000 0.011292-0.095910		6.400000 0.001522-0.098096	
6.700000 0.029492-0.088879		6.600000 0.020641-0.092818	
6.900000 0.045428-0.078722		6.800000 0.037775-0.084157	
7.100000 0.058628-0.066018		7.000000 0.052394-0.072650	
7.300000 0.068752-0.051400		7.200000 0.064091-0.058907	
7.500000 0.075586-0.035538		7.400000 0.072588-0.043582	
7.700000 0.079052-0.019107		7.600000 0.077740-0.027351	
7.900000 0.079198-0.002768		7.800000 0.079532-0.010886	
8.100000 0.076191 0.012856		8.000000 0.078074 0.005170	
8.300000 0.070309 0.027202		8.200000 0.073588 0.020221	
8.500000 0.061919 0.039779		8.400000 0.066401 0.033739	
8.700000 0.051467 0.050190		8.600000 0.056921 0.045277	
8.900000 0.039453 0.058136		8.800000 0.045623 0.054466	
9.100000 0.026413 0.063421		9.000000 0.033027 0.061119	
9.300000 0.012896 0.065963		9.200000 0.019679 0.065036	
9.500000-0.000554 0.065784		9.400000 0.006129 0.066208	
9.700000-0.013419 0.063006		9.600000-0.007091 0.064708	
9.900000-0.025226 0.057846		9.800000-0.019483 0.060708	
		10.000000-0.030600 0.054466	

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10.100000-0.035560	0.050606	10.200000-0.040065	0.046316
10.300000-0.044079	0.041646	10.400000-0.047575	0.036650
10.500000-0.050526	0.031384	10.600000-0.052915	0.025903
10.700000-0.054729	0.020267	10.800000-0.055961	0.014534
10.900000-0.056610	0.008761	11.000000-0.056680	0.003007
11.100000-0.056182	-0.002672	11.200000-0.055131	-0.008222
11.300000-0.053547	-0.013590	11.400000-0.051455	-0.018728
11.500000-0.048886	-0.023587	11.600000-0.045872	-0.028126
11.700000-0.042452	-0.032306	11.800000-0.038665	-0.036091
11.900000-0.034557	-0.039451	12.000000-0.030171	-0.042960
12.100000-0.025558	-0.044796	12.200000-0.020765	-0.046745
12.300000-0.015843	-0.048195	12.400000-0.010843	-0.049139
12.500000-0.005816	-0.049577	12.600000-0.000810	-0.049812
12.700000	0.004124-0.048954	12.800000	0.008939-0.047915
12.900000	0.013589-0.046414	13.000000	0.018032-0.044472
13.100000	0.022226-0.042116	13.200000	0.026134-0.039375
13.300000	0.029721-0.036283	13.400000	0.032958-0.032874
13.500000	0.035818-0.029188	13.600000	0.038277-0.025265
13.700000	0.040318-0.021148	13.800000	0.041926-0.016879
13.900000	0.043093-0.012504	14.000000	0.043812-0.008067
14.100000	0.044084-0.003612	14.200000	0.043911 0.000815
14.300000	0.043303 0.005172	14.400000	0.042271 0.009417
14.500000	0.040831 0.013508	14.600000	0.039003 0.017408
14.700000	0.036811 0.021081	14.800000	0.034281 0.024494
14.900000	0.031444 0.027616	15.000000	0.028330 0.030420
15.100000	0.024975 0.032884	15.200000	0.021416 0.034986
15.300000	0.017689 0.036712	15.400000	0.013835 0.038049
15.500000	0.009892 0.038989	15.600000	0.005902 0.039528
15.700000	0.001903 0.039665	15.800000	-0.002063 0.039404
15.900000-0.005959	0.038754	16.000000-0.009746	0.037725
16.100000-0.013389	0.036333	16.200000-0.016852	0.034595
16.300000-0.020105	0.032534	16.400000-0.023118	0.030173
16.500000-0.025863	0.027540	16.600000-0.028317	0.024664
16.700000-0.030459	0.021576	16.800000-0.032271	0.018310
16.900000-0.033740	0.014901	17.000000-0.034855	0.011383
17.100000-0.035609	0.007792	17.200000-0.035999	0.004166
17.300000-0.036025	0.000541	17.400000-0.035691	-0.003048
17.500000-0.035006	-0.006566	17.600000-0.033979	-0.009978
17.700000-0.032624	-0.013251	17.800000-0.030960	-0.016356
17.900000-0.029005	-0.019262	18.000000-0.026783	-0.021944
18.100000-0.024318	-0.024377	18.200000-0.021638	-0.026541
18.300000-0.018772	-0.028415	18.400000-0.015749	-0.029986
18.500000-0.012602	-0.031241	18.600000-0.009364	-0.032170
18.700000-0.006067	-0.032769	18.800000-0.002744	-0.033035
18.900000	0.000570-0.032968	19.000000	0.003844-0.032573
19.100000	0.007045-0.031857	19.200000	0.010142-0.030831
19.300000	0.013106-0.029508	19.400000	0.015909-0.027905
19.500000	0.018524-0.026040	19.600000	0.020928-0.023934
19.700000	0.023098-0.021611	19.800000	0.025016-0.019096
19.900000	0.026665-0.016416	20.000000	0.028032-0.013599

KA= 1.580000 JMAX= 28 MSTAR= 30

KD RESIJ REACIJ KD RESIJ REACIJ

3.300000 0.020734	0.200216	3.200000 0.044765	0.202859
3.500000-0.022617	0.187999	3.400000-0.001751	0.195148
3.700000-0.059268	0.168572	3.600000-0.041805	0.179055
3.900000-0.088889	0.143900	3.800000-0.074970	0.156781
4.100000-0.111348	0.115680	4.000000-0.101015	0.130135
4.300000-0.126706	0.085434	4.200000-0.119903	0.100721
4.500000-0.135208	0.054537	4.400000-0.131792	0.069986
4.700000-0.137270	0.024224	4.600000-0.137012	0.039236
4.900000-0.133461	-0.004424	4.800000-0.136059	0.009630
5.100000-0.124476	-0.030484	5.000000-0.129568	-0.017829
5.300000-0.111116	-0.053203	5.200000-0.118290	-0.042301
5.500000-0.094255	-0.072005	5.400000-0.103066	-0.063122
5.700000-0.074812	-0.086492	5.600000-0.084797	-0.079805
5.900000-0.053723	-0.096449	5.800000-0.064415	-0.092044
6.100000-0.031911	-0.101830	6.000000-0.042851	-0.099708
6.300000-0.010257	-0.102754	6.200000-0.021012	-0.102835
6.500000 0.010425	-0.099489	6.400000 0.000253	-0.101623
6.700000 0.029410	-0.092434	6.600000 0.020171	-0.096406
6.900000 0.046078	-0.082099	6.800000 0.038068	-0.087641
7.100000 0.059935	-0.069081	7.000000 0.053384	-0.075886
7.300000 0.070615	-0.054036	7.200000 0.065689	-0.061769
7.500000 0.077890	-0.037660	7.400000 0.074687	-0.045971
7.700000 0.081671	-0.020654	7.600000 0.080218	-0.029192
7.900000 0.082002	-0.003709	7.800000 0.082260	-0.012132
8.100000 0.079050	0.012529	8.000000 0.080921	0.004537
8.300000 0.073098	0.027467	8.200000 0.076428	0.020194
8.500000 0.064525	0.040595	8.400000 0.069112	0.034286
8.700000 0.053789	0.051494	8.600000 0.059396	0.046346
8.900000 0.041408	0.059848	8.800000 0.047770	0.056004
9.100000 0.027936	0.065450	9.000000 0.034772	0.063001
9.300000 0.013944	0.068209	9.200000 0.020969	0.067187
9.500000-0.000002	0.068143	9.400000 0.006931	0.068524
9.700000-0.013363	0.065375	9.600000-0.006788	0.067085
9.900000-0.025647	0.060128	9.800000-0.019669	0.063044
		10.000000-0.031246	0.056667

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10.100000-0.036420	0.052707	10.200000-0.041125	0.048297
10.300000-0.045324	0.043489	10.400000-0.048987	0.038338
10.500000-0.052088	0.032902	10.600000-0.054608	0.027240
10.700000-0.056532	0.021412	10.800000-0.057853	0.015479
10.900000-0.058570	0.009501	11.000000-0.058686	0.003537
11.100000-0.058212	-0.002353	11.200000-0.057164	-0.008113
11.300000-0.055562	-0.013689	11.400000-0.053431	-0.019028
11.500000-0.050803	-0.024084	11.600000-0.047712	-0.028810
11.700000-0.044197	-0.033166	11.800000-0.040299	-0.037115
11.900000-0.036064	-0.040625	12.000000-0.031539	-0.043670
12.100000-0.026774	-0.046227	12.200000-0.021821	-0.048279
12.300000-0.016730	-0.049814	12.400000-0.011554	-0.050826
12.500000-0.006347	-0.051313	12.600000-0.001159	-0.051279
12.700000	0.003957-0.050732	12.800000	0.008954-0.049687
12.900000	0.013783-0.048161	13.000000	0.018399-0.046177
13.100000	0.022760-0.043761	13.200000	0.026826-0.040945
13.300000	0.030563-0.037763	13.400000	0.033938-0.034251
13.500000	0.036924-0.030448	13.600000	0.039496-0.026398
13.700000	0.041635-0.022144	13.800000	0.043327-0.017730
13.900000	0.044562-0.013203	14.000000	0.045333-0.008609
14.100000	0.045640-0.003995	14.200000	0.045487 0.000594
14.300000	0.044882 0.005112	14.400000	0.043836 0.009515
14.500000	0.042367 0.013763	14.600000	0.040495 0.017814
14.700000	0.038245 0.021632	14.800000	0.035642 0.025182
14.900000	0.032719 0.028433	15.000000	0.029508 0.031356
15.100000	0.026046 0.033926	15.200000	0.022368 0.036124
15.300000	0.018516 0.037932	15.400000	0.014530 0.039338
15.500000	0.010450 0.040332	15.600000	0.006318 0.040911
15.700000	0.002176 0.041074	15.800000-0.001935	0.040825
15.900000-0.005975	0.040171	16.000000-0.009904	0.039125
16.100000-0.013685	0.037700	16.200000-0.017283	0.035917
16.300000-0.020663	0.033798	16.400000-0.023796	0.031366
16.500000-0.026654	0.028652	16.600000-0.029210	0.025684
16.700000-0.031444	0.022496	16.800000-0.033338	0.019121
16.900000-0.034876	0.015595	17.000000-0.036048	0.011956
17.100000-0.036846	0.008239	17.200000-0.037267	0.004484
17.300000-0.037311	0.000728	17.400000-0.036983	-0.002992
17.500000-0.036289	-0.006639	17.600000-0.0352	0-0.010179
17.700000-0.033852	-0.013577	17.800000-0.032142	-0.016801
17.900000-0.030130	-0.019821	18.000000-0.027840	-0.022609
18.100000-0.025297	-0.025141	18.200000-0.022530	-0.027394
18.300000-0.019569	-0.029349	18.400000-0.016444	-0.030990
18.500000-0.013190	-0.032304	18.600000-0.009839	-0.033281
18.700000-0.006425	-0.033916	18.800000-0.002984	-0.034205
18.900000	0.000450-0.034150	19.000000	0.003843-0.033755
19.100000	0.0007163-0.033027	19.200000	0.010376-0.031977
19.300000	0.013452-0.030619	19.400000	0.016362-0.028970
19.500000	0.019079-0.027048	19.600000	0.021578-0.024876
19.700000	0.023836-0.022479	19.800000	0.025833-0.019881
19.900000	0.027553-0.017111	20.000000	0.028980-0.014198

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960S	(" #7)
961	(" #8)
902	(" #9)
904.2 (5)	(" #10-#14)
D. T. Porter (2)	(" #15-#16)
N. T. Chin	(" #17)
H. L. Rathbun	(" #18)
W. J. Marshall	(" #19)

External

Ernst Prasse (Raytheon)	(" #20)
David Lower (GE/HMED)	(" #21)
V. M.	(" #2)
J. [unclear]	(" #3)
L. [unclear]	(" #4)
S. [unclear]	(" #5)
G. [unclear]	(" #6)
C. [unclear]	(" #7)

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